

which deal with words—only the *signs* of things—are not what the child wants. There is no knowledge so appropriate to the early years of a child as that of the name and look and behaviour *in situ* of every natural object he can get at. It is in the effort to help parents to impart the rudiments of Nature's lore to their children that we devote so much space, month by month, to descriptions of the face of the heavens and the face of the earth. The Star-Map should be a delight to many a thoughtful child who has long wished for the power to identify the glorious objects of the heavens; and the notes of the month, from the pen of the accomplished and sympathetic naturalist—the editor of *Science Gossip*—should give delight to many a ramble, and occasion for many a long glorious day in the open. That these articles should be merely *read*, should be used to add to the floating capital of *simulated* knowledge which most of us trade upon, would be a means of defeating the earnest purpose for which they are produced.

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"He hath so done His marvellous works that they ought to be had in remembrance."

Three years she grew in sun and shower,
Then Nature said, "A lovelier flower
On earth was never sown:
This child I to myself will take:
She shall be mine, and I will make
A lady of my own.

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"She shall be sportive as the fawn,
That wild with glee across the lawn
Or up the mountain springs;
And hers shall be the breathing balm,
And hers the silence and the calm
Of mute, insensate things.

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"The stars of midnight shall be dear
To her; and she shall lean her ear
In many a secret place
Where rivulets dance their wayward round,
And beauty born of murmuring sound
Shall pass into her face."

"The whole of the 'Editorial' and an undue proportion of articles devoted to a single topic!" Spring is upon us, and "Urgency" is our excuse.

Infant Development.

BY DR. JAMES WARD.

From a Lecture delivered in Cambridge.

Not a little harm has, I suspect, been done by the over-statement we often hear, "Change of work is as good as play." It is no such thing. Good, no doubt, it is, and better than entire idleness in many cases; but play is work for children, *i.e.*, it is active occupation, and change to this form of work they require at pretty frequent intervals, if their other work is to have any zest in it. A healthy child, three years old, perhaps runs two or three miles in the course of the day, but would be seriously tired if it had to run a quarter of a mile at once. Children are soon exhausted and soon refreshed. And we have to remember that their brains, like the rest of their bodies, have double work to do, where the work of the adult brain is only single; the child's brain has both to act and to grow. Nay, it has to grow in two respects, both necessitating frequent relaxation or entailing certain injury. It has to grow in bulk, and it has to grow in complexity of structure. Besides sufficient, but not excessive exercise, the chief condition of growth in bulk is well-nourished and well-aerated blood, and with this long confinement is incompatible. The chief condition of the other and higher growth is due rest after exercise to enable the new nervous connections to perfect themselves. The brain is not a delicate organ in the sense of being easily hurt by work, and even hard work; but it is extremely delicate in this sense, that all forcing and excessive strain deteriorate it in strength, and still more, perhaps, in quality; it is in this like a good watch, which will serve you your lifetime with care, but is almost sure to snap somewhere if you overwind it. Parents and headmasters and mistresses must have a real acquaintance, though it need not be profound, with the physiological laws on which bodily growth

and vigour depend, before the rising generation can be secure against "the educational abomination of desolation," as Prof. Huxley calls it—that brain-forcing which is now too much in vogue in middle-class schools. Without this the foolish public is just as likely, if it should ever become alarmed, to err to an equal extent in the opposite extreme, and refuse to children the mental quickening their brains require.

But, besides this, there is a much more intimate connection than is commonly supposed between moral health and bodily health. I do not mean that soundness of body is alone sufficient to ensure generosity and purity of heart, but that active exercise is a check to many temptations which are only too powerfully abetted by sluggish limbs and hysterical nerves, "while he whom toil has brac'd or manly play" has not only "light as air each limb, each thought as clear as day," but most likely has, too, an abounding good nature and cheerfulness which provoke and strengthen friendly feeling.

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The actual beginning of consciousness is as indescribable as the beginning of life. Even the earlier stages of consciousness can only be inferred from a study of the later, and by interpreting the external behaviour of infancy in analogy with these. But among the materials of consciousness, the sensory and motor objects presented to the young soul, when attention first awakes, we may safely reckon all the varieties of sights, sounds, touches, tastes, smells, for which it has organs and opportunities, and all the movements its limbs by any chance may execute.

We may go further, and instead of supposing the entire formation of this mental chaos into a mental cosmos to depend on the child's own activity, may reasonably suppose that it starts with certain lines of association at least prepared beforehand and vaguely indicated. To grant this is to grant the doctrine of psychical heredity; the doctrine, that is, that those connexions which were slowly established between some cells and others in the brains of its ancestors in the course of, and in consequence of, their experience, are already more or less completely preformed in the child's brain before its experience begins—so far preformed that a minimum of experience in its case suffices to perfect the connexion, say, between a certain sensation and a certain movement which, in the case of its

forefathers, was only perfected after the lapse of years, perhaps centuries. It is to this inherited difference of organisation and consequent difference of mental possibilities that we must often refer the varying rapidity with which different minds unfold in particular directions, and the varying interest they take in different pursuits. In view of facts like these—which I regret there is not time to consider more fully—any one may be pardoned doubting whether the same means will prove equally adapted in all cases to secure the same end; whether what will best train one mind and disposition will best train another and different one. People in the western counties travel eastwards to get to London, but those in the eastern counties would have an expensive and fatiguing journey if they did the same. It is not, then, enough for parents and teachers to have distinctly before them an educational ideal; it is hardly less important that they should understand the individuality, as we say, of their pupils. Even a horsebreaker can't dispense with such knowledge; much more, then, is it impossible to be a good educator without the tact and insight to understand your pupils.

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But it is primarily with what is common to the growth of all minds that we have now to do, and here also there is room for some weighty practical reflections, let us however first see something of the growth itself. Though the organised experience of its ancestors may enormously accelerate the infant's earliest progress in knowledge, yet we shall not be far wrong in supposing it to advance by gradual steps even here. Its great defect at the outset is inability to concentrate attention. For want of this it is some time before even the first step can be taken towards the simplest combination of the material constantly provided for it by its senses and its own spontaneous or instinctive movements. The massive sensations of organic life, the sensations I mean connected with breathing, pulse, digestion, the feeling of being well or ill—to all of which we adults are oblivious except when they are very acute, because our interests carry our attention elsewhere—these organic sensations probably form for some time the staple elements of the infant consciousness. Amid such a mass the light and transient impressions of the higher senses fail at first to afford

any pleasure, and so fail to call forth any interest comparable to the solid satisfaction of a vigorous digestion, and a glowing pulse: the young hopeful vegetates triumphantly. After a while, however, the preliminaries and essentials of a meal come by reason of their contiguity in time to the meal itself to secure some attention, and to be known by themselves; to the spoon belongs the merit of first enticing the baby mind into the regions of objective knowledge. But soon the fortunate moments become more and more frequent in which a moving light, the jingle of a rattle, or the magic pinches which nurses administer, carry it still further in the same direction. Its consciousness is no longer that of a huge oyster in a heavenly dream, the chaos before it begins to shape itself into nebulous wholes, faces and moving objects stand out vaguely from the general blur, and everybody is agreed that baby "begins to notice." But how very obscure and ill-defined these earliest perceptions are is brought home to us most strikingly by comparing infantile movements with our own. There is no reason to suppose the ability to perform any definite movements to lag far behind the ability to form definite perceptions. Baby expresses his pleasure by the most various antics, in the course of which many movements that will afterwards be purposive occur by chance, but it is long before any one can be performed apart from the rest. The child at first can do nothing without doing everything. Every excitation arouses the whole brain, instead of discharging itself along definite tracks; like a downpour of rain on some land new risen from the bed of the sea, and on which the weather has still to trace out a network of streams and rivers. As the one process takes time, so does the other, though both seem very much matters of course to the unreflecting observer when the development is complete.

Now the great means of advancing this parcelling out of experience into parts, of making groups of definite objects and acts out of an indefinite maze of sensations and movements, is *Interest*. The uniformity of nature; the regular recurrence of sweet and white in sugar; of "meows" and scratches when puss is picked up by the tail—does much to suggest which two and two to put together. But ages may elapse before we take the hint, unless, as in the above instances, we are interested. And for my own part, I doubt not that ages did elapse before the creature mind appreciated and appropriated even the most

elementary lessons which an Infinite Patience had planned for it.

Interest in sensations it is, as we have seen, that determines movements, and on movements in connection with sensations a very very large part of our knowledge depends. What we learn by means of our eyes and our hands would be reduced almost to *nil* if we were prevented from moving them. Interest also works by concentrating attention on some objects to the exclusion of others; and here again its connection with movement is apparent, though this time it is by checking movements that are begun, the continuance of which would draw off attention. And in these two ways the infant individualises objects and separates among the mass that is presented to it together those things that belong together. The buffet that lies on the floor is distinguished from the floor on which it lies, and the clatter of a rattle from the many other sounds heard simultaneously. But beyond this narrow region of its experience, or rather these isolated patches, into which its formative activity has introduced the beginnings of order, the primal indistinctness and confusion reigns; and will reign till interest furnishes the budding intelligence with a motive to enter and assimilate.

This interest, as we have seen, is determined by pleasure and pain; but what determines these—what is there common to all that pleases us? If I answer, "*Doing what we please*," you may perhaps think this as good as no answer at all. But you will find it much truer than at first sight it seems, that all pleasure involves doing, involves activity. Even the apparently passive pleasure of watching a display of fireworks, or hearing the waves break upon the stones, requires activity, and involves fatigue; so that if your eyes or ears were already exhausted, or you were yourself generally weary, these things would please no longer. And when everything about us is too indifferent and monotonous to engage or retain our attention, we long for occupation and change, or fall asleep for want of them. In saying that the activity concerned in pleasure is *doing* what we please, I mean all such activity as we engage in spontaneously, our energies being fresh, and either waiting or seeking the opportunity for action. Such is the position of healthy children let loose from school. During the quiet and constraint of the morning's lessons their muscles have been

rested and refreshed, and now find vent in wild shouts and play. Of such sort is the activity of a child for the first three or four years of life. All that it does it does because fresh and ready for the work; one advance secured, it has an interest in the next, to which it was before indifferent. It does not attempt to bite till its teeth begin to work their way through its gums; nor to articulate till it has learnt to babble; nor to walk till it can crawl. And so, doing only what it is ready to do, and therefore has an interest in doing, advancing under the prompting of its own growing powers, it advances with enormous rapidity. In two or three years it has learnt, without trouble or fatigue, a vast number of complicated movements, is practically acquainted with space, knows the properties of numerous objects, and above all, has acquired an intelligent command of language. This is probably a goodlier array of acquisitions than any it will have to show after ten years of school. No doubt in this it is helped by heredity; very naturally our inherited experience is realised and put to use as soon as it can be useful. But this does not affect the practical lessons to be drawn from this early study of infancy, nay, it adds to them. The child has not yet exhausted this organised heritage of his ancestors; there is still a natural order of mental development and the process is still the same:— from the more general and simple separations and combinations of the elements of its experience to the more complex. And when we see how surely and thoroughly the tiny scholar advances in knowledge while this method is of necessity followed, we must allow the desirability of abiding by it still, when nature's training begins to slacken and to need supplementing by other means. The younger the pupil is, the more imperative is it for the teacher to direct growth that is incipient, but to avoid all forcing and the foolish haste that tries to cram with ready-prepared material, as if the time required for mastery and assimilation were time lost.

During infancy, *i.e.*, till the seventh year, or later, the mind is mainly occupied in the way described in mastering the rudiments of perception and movement, and so much of language as this involves. What it has thus accomplished remains its permanent possession and can be lived over again

in fainter forms, without the repetition of the original experience. Still more it can be recombined in other forms, independently of external presentation or actual movement, *i.e.* to say, the young child can imagine what it does not see and has not seen; but only by the aid of pictures or narratives. Imagination is as yet to a very small extent constructive; children under eight or nine have little fancy and less thought. Picture books, nursery rhymes, and fairy tales, if they promote only good nature, kindly feeling, and dislike of wrong, are admirable adjuncts of toy hammers, bricks, spades, and buckets. But in my private opinion they should be only adjuncts; a child is, I think, receiving higher education when engaged in such play, or in ripping up and smashing the handsomely-finished toys with which unphilosophic grandmothers love to adorn their Christmas trees. When a little child is so quiet that his mother or nurse suspect mischief, he is probably making most strides towards being a man of independent judgment and character. When he is tired of entertaining himself, then bring out the pictures, or, still better, draw new ones before his eyes. And if you tell him a tale tell him an old one rather than always something new. For if the tale is a good one, and will help to make him a man, the impressions must be deepened if they are to be fixed. Besides, everlasting novelty will tend to produce a vapid and wandering mind. I need hardly say that all this implies an amount of individual attention which no school teacher could afford to give, but then is it not clear that schools for children under six or seven are only good where home education is impossible? The Kindergarten system in the hands of one who understands it produces admirable results, but it is apt to be too mechanical and formal. There does not seem room for the individuality of a child, to which all the free play possible should be given in the earliest years; afterwards it can more effectively take care of itself, and will be less easily repressed.

